Problem	1	2	3	4	5	6	Total
Points:	10	20	20	10	10	30	100
Score:							

This homework assignment has 6 problems, for a total of 100 points.

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1. (10 points) Identify all of the following statements that are true. Where the statement is about a paper, please specify the corroborating part of the paper (e.g., "page 32, second para").

   A. As described by Jeffrey Travers and Stanley Milgram, the Rapoport and Horvath study involved first developing a social graph and then analyzing it for connectivity

   B. As described by Jeffrey Travers and Stanley Milgram, their own study involved first developing a social graph and then analyzing it for connectivity

   C. Mark Granovetter defines tie strength between two individuals in terms (not exclusively) of the time they commit to each other

   D. Mark Granovetter's definition of the degree of a local bridge equals the number of hops the bridge saves minus one

   E. Mark Granovetter suggests that central figures in a social network are more likely to adopt innovations

2. (20 points) Of the following statements, identify all that are true.

   For the problems that mention the number of items being auctioned, the number of items equals M, the number of sell bids. (Each bidder bids on one unit.) These problems are for uniform-price auctions meaning that any parties that trade pay or receive the same price.

   A. Incentive compatibility is an important criterion when serious goods such as wheat are being traded, not for frivolous good such as music (which you can usually get for free)

   B. Prices work in markets under the assumption that each agent values a larger amount of money no less than a smaller amount of money

   C. If Alice values a book she owns at $50 and Bob values the same book at $60 and doesn't own it, then if Alice sells the book to Bob for $51, the result is Pareto optimal

   D. If Alice values a book she owns at $50 and Bob values the same book at $60 and doesn't own it, then if Alice's parents make her sell the book to Bob for $15, the result is not Pareto optimal

   E. Given lotteries L_1, L_2, and L_3, any rational agent (in the sense of traditional economics) who prefers L_1 to L_2 and is indifferent between L_2 and L_3, necessarily prefers L_1 to L_3

   F. The Mth price is the highest price that ensures equilibrium

   G. The third-price auction for a single item would be incentive compatible for buyers

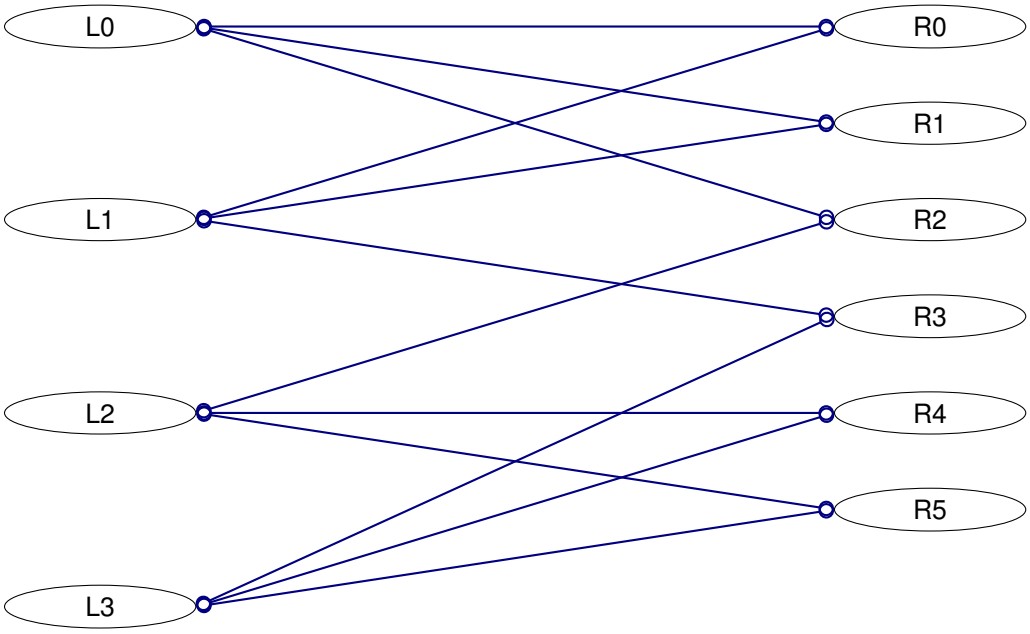
   H. The third-price auction for two items would guarantee efficiency and be incentive compatible for buyers

   I. The first-price auction for two or more items would not be incentive compatible for buyers

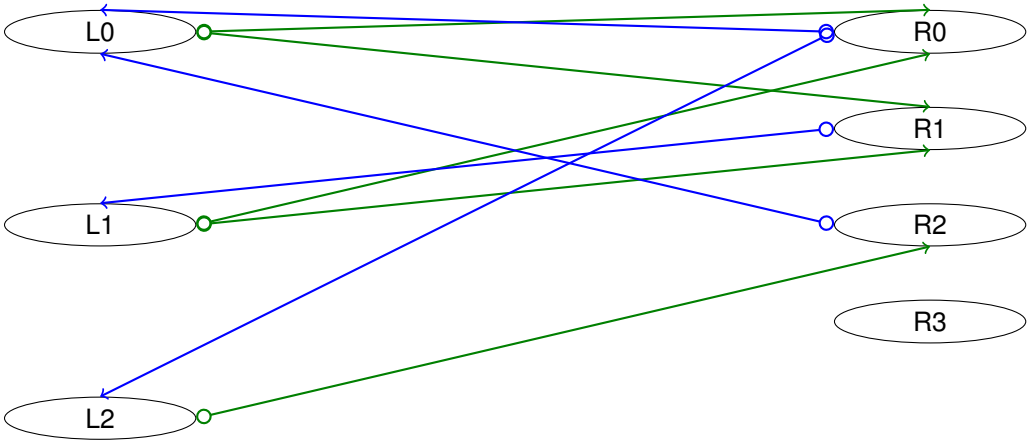
   J. The first-price auction for two or more items would not be efficient

3. This problem concerns social networks that have a bipartite structure involving two subpopulations, Left and Right.

   (a) (5 points) Consider the network as the following undirected graph. Calculate the clustering coefficient (as defined by Watts and Strogatz) of any one member of Left.



   (b) (15 points) Treating the network as the following directed graph, *approximately* calculate the PageRank of R1. For concreteness, apply the method outlined by Yolum (page 404, right column). Specifically, begin by assigning the same PageRank to all vertices and applying the iteration two times. Show the values as initialized and then resulting from the first and the second iterations. To simplify the computation, disregard the normalization and choose the parameter d and the initial values in any way that helps (not necessarily those in the paper).



4. (10 points) Analyze a beauty contest game under the following conditions.

   - Each participant may propose a natural number between 0 and 100.
   - The winning condition is being closest to 60% of the mean.
   - We define a Level n thinker as follows.
     - A Level 0 thinker does not think about others.
     - A Level 1 thinker assumes everyone else is a Level 0 thinker.
     - A Level n thinker (for $n \geq 2$) thinks that the remaining population is split equally between Level $(n-1)$ and Level $(n-2)$ thinkers.
   - Feel free to consult the early part of the Camerer article, although the Step k definition in Camerer's article is different from Level k as defined above.

   What number will a Level 3 thinker propose?

5. (10 points) Consider McCulloh's discussion of transitivity (page 117). Discuss transitivity in connection with Pickard et al.'s reward mechanism for social mobilization in the balloon hunt setting.

   Use about 30–50 words.

6. Consider an enterprise crowdsourcing setting wherein you seek to query the staff of an enterprise to determine whether and how much to bid on a large project. For specificity, assume the project is to build a healthcare IT system for Iceland and it involves software development based on legal regulations and user needs, deployment, day-to-day operations, and maintenance in light of revised regulations.

   The idea would be obtain information from the staff and to aggregate it so as to make a decision based on the best of what the enterprise's knowledge is.

   (a) (5 points) Building on the discussions between Galton and those who responded to his articles (such as Hooker), describe one possible objection to the results you find from querying enterprise staff.

   Use about 15–30 words.

   (b) (15 points) From a reading of Tverksy & Kahneman's Heuristics and Biases paper, describe two possible ways in which enterprise staff may produce biased information.

   Use about 15–30 words per objection.

   (c) (10 points) Building on the discussions between Tverksy & Kahneman and Gigerenzer, describe one possible rephrasing or reframing that would characterize Gigerenzer's response to any one of the previous biases.

   Use about 30–60 words for this part.